

AVIATION WEEK

A McGRAW-HILL PUBLICATION

SEPT. 11, 1950

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A YEAR



THE PANTHER U. S. Navy's Jet Fighter

Just minutes ago this GRUMMAN PANTHER took off from the deck of a carrier miles over the horizon. Now, with others of its squadron, it is ready to perform its mission. (Note rockets under wing.) Impressive speed and formidable fire-power, plus traditional Grumman ruggedness, make the turbo-jet PANTHER a highly respected member of the Navy's air arm.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE

Contractors to the Armed Forces

"DIXIE" HOSPITALITY KEEPS 'EM FLYING AT MEMPHIS!



AT MEMPHIS MUNICIPAL AIRPORT, Memphis, Tenn., Dixie Air Associates are sold by Dixie Air Associates.



DIXIE AIR ASSOCIATES—Conveniently located near Administration Building for prompt efficient service, **FAST, RELIABLE SERVICE** spills real "Southern hospitality"—and that's what flyers enjoy when they land at Memphis Municipal! At this modern, efficient air terminal, Dixie Air Associates provide round-the-clock hangar and tie-down facilities, expert aerial and engine repairs by skilled, licensed mechanics—and top-quality maintenance and relaxing service with the best aviation fuels and lubricants!

DEPENDABLE ESSO AVIATION PRODUCTS sold by Dixie Air Associates are backed by constant research in America's largest and finest aviation petroleum laboratory. And over 40 years of actual flying have made them famous from Maine to Texas for efficient, reliable performance!



SERVICING BUSINESS PLANES is an important part of Dixie's operations. Fleet Manager Del Miller, (right) discusses maintenance with A. W. Frederick, Marchant Calculator Distributor, Memphis.



AVIATION PRODUCTS

SOLOMON BROTHERS & CO., INC., 1000 N. Dearborn St., Chicago, Ill. 60610
Pittsfield, Ohio • San Antonio, Tex. • Atlanta, Ga. • Birmingham, Ala. • Dallas, Tex. • Denver, Colo. • Fort Worth, Tex. • Houston, Tex. • Kansas City, Mo. • Louisville, Ky. • New Orleans, La. • Oklahoma City, Okla. • St. Louis, Mo. • Seattle, Wash. • Tulsa, Okla. • Wichita, Kan.

B.F. Goodrich



How to shut up a torrent of hot air

THE AIR DUCT in the photo above is 10' x 200 cu. ft. of air in free flight at 600 cu. ft. per sec. at 600 ft. of head or 250°F. It's used to keep the cabin warm in the C-124, Globemaster II, large cargo and transport plane built by the Long Beach Plant of Douglas Aircraft.

The duct designer would to make it an air-tight section of semi-flexible metal material so it wouldn't damage from rocks, trucks and other heavy equipment carried by the C-124. But they had a problem on their hands in finding a coupling for the sections it had to be flexible, strong, heat-resistant and prevent removal of sections

B. F. Goodrich engineers thought Pressure Sealing Zippers—developed by BFG engineers—might fill the bill. Test showed they were right.

The zippers needed rubber lips which extend all the way around the duct, provide a 100% efficient seal. The zipper is extremely flexible (far steeper than a snap, shape, such as square, octagon and others where clamps won't hold). It takes the high temperatures it creates damage. It remains tight onto either fabric or metal. And it puts plenty of zip into duct maintenance. Just rip out a damaged section, zip in a new one—in

a matter of moments.

B. F. Goodrich Pressure Sealing Zippers are doing a successful job, in airplane ducts, aircraft covers, warm, tight protective coverings and coverall surface seals. They are adaptable to any kind of covering irregular shapes, and light or heavy requirements.

To help with your coupling problems, contact the Pressure Sealing Zipper engineers at The B. F. Goodrich Co., Aerospace Division, Akron, Ohio.

B.F. Goodrich
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FOR YOUR CONTROL NEEDS...use Macwhyte cables...terminals...assemblies

Macwhyte's "Hi-Torque" Aircraft Cable is available in reel lots, specified lengths or assemblies. It has uniform, maximum stretch throughout the reel which provides efficiency and economy in making assemblies, resulting in maximum service.

Macwhyte's "Safe-Lock" Terminals may be ordered loose or attached to cable, ready for use.

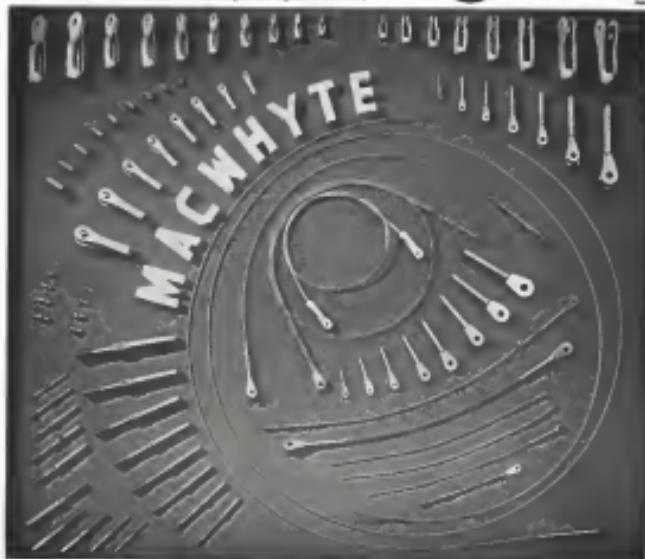
Call a Macwhyte distributor or send inquiries direct to Macwhyte Company, Catalog A-1 is available on request.

MACWHYTE COMPANY 2382 Franklin Drive, Kenosha, Wis.
Manufacturers of "Hi-Torque" Aircraft Cable • "Safe-Lock" Cable Terminals • Cable Assemblies • Tie Rods • Braided Wire Rope Slings Bright, Galvanized, Stainless Steel and Monel Metal Wire Ropes



Member AIA-MCA, and A.I.A.

"Hi-Torque" is a registered trademark



WHO'S WHERE

In the Front Office

General Electric Co. has named Robert Peixot manager of manufacturing policy, succeeding Raymond K. Roads, a vice president, who has resigned in return to the insurance industry. Peixot has been manager of the insulation and allied product division of the Appliance Department.

Douglas Stratton, who has been associated with aircraft engine design for 20 years, has been made manager of the aircraft engine division of the Lincolne Co., Lincoln, Neb., and will be in charge of work on the company's spark ignition engines.

Engines A. Brown is the new advertising manager of United Air Lines, takes over from R. E. Johnson, who was recently promoted to director of public relations and advertising. He joined United in 1944.

In the Sales Office

John W. G. Ogilvie has been appointed to sales manager of Pan American Air Lines, Inc., effective 1947, he has been Pan American cargo sales manager.

Communication division of Boulle Radio has named Arnold Roosberg general sales manager, and R. E. Moon general product sales manager. Roosberg succeeds W. H. Hirschfeld, who has been promoted to Boulle's first vice president in charge of sales. Remondos Associates has appointed Basil Hudspeth sales manager. John W. Thompson, formerly public relations director of the Air Transport Assn., now is vice president of Roland Bond Production, Washington, D. C.

Changes & Appointments

Stephen T. Keating, director of military contracts of Minneapolis-Honeywell Regulator Co., has been elected an assistant secretary of the company. Carl R. Hanes succeeds George C. Fletcher as director of engineering of Fletcher Aviation, Inc., parent company of Fletcher Aviation Co., Bothell, Calif., to head the firm's technical division in that company.

Jack E. Nichols, formerly Gorham Wright pilot, has been appointed to a company public relations representative for the Boeing Co. headquarters in Washington, D. C. He is taking over from Carl Cleveland who is returning to Seattle after a temporary assignment in Washington, D. C. Nichols has been a leading member of the Seattle Helicopter Corp., serving as vice chair of the Seattle Aviation Assn.

Jack M. Shadley is the new director of flight schedules at Western Air Lines. He has been with the airline for four years.

Prather has assumed presidency of the Latin American division. He started with the airline in 1935, accumulating 14 years 10 months.

Republika Aviation has delayed until the Federal Bureau of Investigation for its new director of security. His Allan J. Tauch, who has been a counter-espionage specialist in some of the FBI's biggest cases.

INDUSTRY OBSERVER

High-altitude aircraft the Navy is buying in its new procurement program is the search radar-equipped long-range Lockheed PTV patrol bomber, costing \$1.25 million apiece. Douglas F3D night fighter is the most expensive Navy jet on order, costing a little over \$4 million per plane.

Macwhyte's principal aircraft companies, Beech and Casner, expect to split the bulk of their production to military contracts within the next few months. Casner has major subcontracts with Boeing for B-47 aircraft components, while Beech is preparing to convert to other military aircraft business, and is opening a manufacturing center at Birrington, Kan., where it will install wing tanks on Douglas B-17 bombers at its first cost of business.

North American F-51 Mustang, top fighter of World War II, is continuing to return to service in peace time. Canada has just arranged to purchase 180 of the piston-engine fighters from USAF, while 51 additional Mustangs were recently assembled at Lockheed Aircraft Service, Springfield, N. Y., for long flight delivery to European countries.

Canadian Department of defense recently contracted with A. V. Roe, Ltd., to construct 50 Lancaster four-engine bombers for Adlantic and Pacific RCAF, plus Casner Ltd. an additional order for 90 B-52B jet fighters, and placed an order in England for an undisclosed number of Hawker Sea Fury carrier-borne fighter-bombers.

Original prototype Lockheed Constellation C-69 which has been used by the manufacturer for stage tests and experiments will be used to try out the modification involved in the Model 1049 Constellation with 180,000-hour usage. Navy has purchased this version under an \$80 million designation.

Douglas is expected to receive a Navy order soon for 11 DC-5A cargo planes, successors of the Liberator prototype. They are 4 ft. longer in fuselage than the original DC-4. The manufacturer still has 100 unused stage contracts under the original version.

Prather Peckets are in action in Korea in cargo drops and in delivery of supplies.

New V-11 Lockheed Constellation ordered for Gen. Douglas MacArthur, equipped with special radar and communications equipment, has been named the "SCAF" (Supreme Commander Allied Powers) MacArthur's plane. Lt. Col. A. F. Sherry, test delivery of the RCAF at Borden, Ont., week, and was scheduled to leave immediately for Tokyo. Peckets carry no surface map of the Japanese islands painted on its nose.

Production on the Navy's Chance Vought F4U-5N Corsair fighter, still contract for at least another year, on the basis of present orders, Navy spokesman recently informed Congress. Navy has also finally approved a small production order for Chance Vought F7U "Swallow" Carrier fighter.

Biggest single order on the list of Navy planes is the Grumman PFF fighter. MacDonnell Douglas jet fighter was second, with almost equally large order.

Vickers Viscount 700, prototype of the production version of the four-engine short-haul transport ordered by Vickers-Fokker Airlines, made its first flight Aug. 8, 1946. The Viscount 700, like the earlier Viscount 610, is powered by four 1,600-hp Daimler-Benz A655 piston engines rather than the 250-hp Pratt & Whitney R-1830-86B in the Viscount 610. BEA, which has ordered 26 Viscount 700s, has been using the 610 on scheduled flights to Paris and within England.



RUGGED



CHASE planes are designed and built to withstand severe landing shocks on short or unpaved fields, providing maximum safety to cargo and crew.

Examples of the ruggedness are the nose section of welded steel tube construction, and sturdy bulkhead between the right and the cargo decks.



AVIATION CALENDAR

Sept. 20-24—Instrument Society of America annual conference and exhibition, at the Coliseum, Houston, Tex.

Sept. 24-26—Conference on general technology for air transportation, Massachusetts Institute of Technology, Cambridge, Mass.

Sept. 18-22—8th annual convention, National Truck Council, Missouri Auditorium, Buffalo, N. Y.

Sept. 19-21—Joint meeting on aerospace and electronics, sponsored by the Institute of Navigation, the Radio Technical Corp. Institute for Aerodynamics, and the Radio Technical Committee of the American Society of Mech. Engs., Hotel Astor, New York City.

Sept. 25-27—1952 national electronic conference, Edgewater Beach Hotel, Chicago.

Sept. 28-30—Aeronautic meeting and an eng. and exp. display, Society of Aerospace Engineers, Hotel Silverside, Los Angeles.

Sept. 29-30—10th annual convention of International Northwest Airlines, Carroll, San Valley, Idaho.

Oct. 3-5—North annual convention, Air Line Dispatchers Assn., Canyon Ranch, Colorado.

Oct. 5-12—Meetings of National Academy of Science, General Electric Co. research laboratory, Schenectady.

Oct. 9-12—5th annual industrial packaging and materials handling exposition, Convention Hall, Philadelphia.

Oct. 12-15—59th conference on aircraft materials and structures, Midwest Research Institute, North Campus, University of Missouri, Columbia, Mo.

Oct. 16-20—1952 annual general meeting of the International Air Transport Assn., Fairmont Hotel, San Francisco.

Oct. 14-18—Annual conference of the Society of the Plastics Industry, Inc., in cooperation with Harvard Business School, Somerville, Mass.

Oct. 12-15—11th annual meeting, American Wildlife Society, Hotel Sherman, Chicago.

Oct. 14-18—Third annual Materials Handling Conference, sponsored by Westinghouse Electric Corp., Hotel Statler, Buffalo, N. Y.

Oct. 21-25—Flight Safety Foundation's annual Safety Seminar, Denver, Colo.

Nov. 2-5—1st—English meeting of American Astronautics and Meteoritics Assn., Aerospace Board, Los Angeles.

Dec. 16-18—Wright Brothers Lecture in tribute of Aeronautical Science, U. S. Chamber of Commerce Auditorium, Washington, D. C.

Jan. 15-19—1953 West Coast aerospace show and conference conference on plant and plant expansion techniques, Cleveland, Ohio.

Jan. 24-26—1st—annual meeting of the Institute of Aeronautical Science, Hotel Astor, New York.

May 19-23—9th World Transportation Fair, Santa Anita Park, Arcadia, Calif.

PICTURE CREDITS

T—McGraw-Hill, World News, WWD
T—McGraw-Hill, U. S. News & World Report
T—McGraw-Hill, Air Transport News

NEWS DIGEST

DOMESTIC

CIA received dealer certificates of Power Air Lines, Inc. Sept. 10, 1951. This is the first long-distance seasonal air freight franchise by CIA.

Shipments of cutaway-type and per used planes reached 206 in July for eight member companies of Aircraft Industries Assn. Total value of \$1,613,400 includes 120 planes four place and over, 75 one place and two-place. Export of 18 planes was worth \$162,493.

North America's B-45 Tornado can drop heavy bombs accurately at speeds over 500 mph. High-speed bombing tests at Edwards AFB have shown developing bombs bay doors slide up and over the plane, so bombs fall directly into aiming, minimizing turbulence effect on bombs.

CIA has received unusual registration of Golden North Airways, Inc. For boats, Alaska Golden is operating two frequently and regularly, says CIA.

Dr. Paul Rosenblatt, consulting phys. has been appointed general director of the IOM-RKA-ITCM joint meeting on aviation and electronics, to be held at Hotel Astor, New York Sept. 15-21.

Am. Digest magazine, 15 year-old aviation monthly, was sold last week to Lemont Press, Inc., Washington, by the heirs of Frank A. Tashjian, of New York, its long-time publisher. Fred Hirsch, head of Lemont Press, and newly elected president and treasurer of the American Digest Publishing Corp., plan to move publication offices of the magazine to 141 Washington editorial offices in the Warner Bldg.

American Aviation magazine has announced that it will shift to weekly bi-weekly publication, starting with the Sept. 11 issue. This is to alternate "news edition," comes advertising, with regular edition.

George LeBeau, Dayton operator of Fairchild Engine & Airplane Corp., died at a heart attack during a meeting the Higginson Mid-Fairchild plant.

Rep. Alfred Eubank, long-time friend of aviation on Capitol Hill, and former chairman of the Transportation subcommittee of the House Interstate and Foreign Commerce Committee, died at his home in Columbia, N. C.

Rebemen Airlines' DC-3 crashed shortly after takeoff from Glendale County Airport (over Utah, N. Y.), killing 11 persons and injuring ten. It was the first fatal accident suffered by a certificated feeder operator.

TWA Constellation crashed in the desert west of Egypt's Nile delta, killing all 55 passengers. It was the first fatal accident involving a U. S. international flag carrier since April, 1948.

RDB Committee on Defense has this new industry liaison liaison John S. Newton, vice president in charge of aerospace, Bellanca, Learjet, Learjet Works, Philadelphia. James Farnas, vice president, Consolidated Edison Co. of New York and Dwight T. Colley, vice president, Atlantic Refining Co., Philadelphia.

FINANCIAL

Tracon stockholders voted to increase the authorized number of shares of common stock from 100,000 (\$1 par value) to 355,000 (\$1 par). A dividend was also voted of one share conversion for each share of common held. The stock dividend will be payable Sept. 15 in stockholders of record as of Sept. 5.

Pilotry Appliances Co. reports a net of \$249,070 for the year ended July 31, 1951. The company's revenues were \$1,000,000. The net profit was \$10,000. The company's revenues were \$1,000,000. The net profit was \$10,000.

A. V. Roe Canada, de Havilland Aircraft of Canada, Ltd., operating at the start of a 90-foot research laboratory building program, at the end of World War II. This will be used by RCAF in anti-sub weapons.

A. Tippin Bellanca lightplane has set a new world record for a single gross weight aircraft, carrying 780 lbs. in its cargo area, according to Barnes 155 ton C-50. It is a product of Adams Farns, S. A. of Belgium.

BEA settled its losses this year as compared with last year. Fiscal year ended Jan. 5, 1952, will probably be less than last year.

Aeromarine of Colombia is purchasing two C-46 cargo planes, bringing its cargo fleet to 11 planes. Aeromarine is not solving a similar purchase but has made no commitments as yet.



FUNCTION

Undercarriage extension by a single cylinder of a production AF-500.

Stair load lifting, 30,000 lbs.
Aircraft operating load, 7,200 lbs.
Operating speed, 100 fpm.
Weight 22 lbs (empty).
Width 16 in. Height 60 in. Length 100 in.

FEATURES

(1) Overhead Cowl with self-closing self-locking
(2) Heavy-duty Actuator
Overhead Drive
200 lb. Counterbalance & Return Motor
Bellows.

10 LBS. HR. 30 Volts
W. 20 lbs with
Magnetic Brake &
Clutch.





Another typical aircraft forging by Wyman-Gordon — with an over-all measurement of more than 45" this intricate alloy steel forging is a vital wing support for a modern military bomber. For applications of such importance the best technique known in forging practice is essential, assuring scale-free surfaces, close dimensional tolerances, uniform minimum weight and maximum strength — There is no substitute for Wyman-Gordon experience.

Standard of the Industry for More Than Sixty Years

WYMAN - GORDON

Forgings of Aluminum, Magnesium, Steel

WORCESTER, MASSACHUSETTS, U. S. A.

HARVEY, ILLINOIS

DETROIT, MICHIGAN



CANBERRA MK. 2, the production version of Eng. I, is the first British four-engine bomber to use nose, position for third crew member.

New Planes Show Increases In Performance

RAFTHREE-POWERED METEOR (right) uses Armstrong-Siddeley's latest jet engine, each rated at 17,000 lb. static thrust.

CONVAIR XPY-1 (below) set a new endurance record for nonstop flight of 8 hr., 6 min. (AVIATION WEEK Sept. 4)





T-34 INSTALLATION in use of B-37 three-spool diameter of 3780 hp engine. Tailplane below trailing down thrust horizontally

P&W Reveals Most Powerful Turboprop

American and British Turboprops

Here is a comparison of American and British turbine propeller engines currently in development which have reached flight test stage. Figures are based on manufacturers' announced data

Big transport use seen for T-34, now being flight tested.

By Alexander Moshach

A new propeller turbine engine, developed at the most powerful of its kind now flying, was announced last week by Pratt & Whitney division, United Aircraft Corp.

The new 3780-hp T-34 turboprop takes leadership in its class along with two other high-powered Pratt & Whitney engines. Unveiled by other fly-by engine in their respective classes, are the Pratt & Whitney T-34, the Westinghouse R-4850, rated at 4800 hp in its latest proposed version, and the J45 turboprop engine, rated at 2350 lb-thr. (These last three afterburner or after injection).

More Powerful. The usually conservative manufacturer states that the T-34 is more powerful than any previously announced British or American turbo-

Company	Design	Horsepower	Compressor		Weight	Diameter
			Low	High		
Pratt & Whitney	T-34	3780	0.67	3550	30	
Allison	T-40	3500	0.63	2910	40	
Allison	T-34	2750	0.61	1250	36	
Armstrong-Siddeley	Python	4100	0.54	3300	34	
Armstrong-Siddeley	Mamba	1400	0.89	760	26	
British	Thrustos	3000	0.66	2600	36	
Rolls-Royce	Dart	1400	0.87	940	36	



SIM DESIGN of T-34 three-spool engine. PAW's first engine of this type



POWER is displayed in flight with T-34 pulling B-17 with all four propellers.

prop that has reached flight test stage and that it also has a higher power-to-weight ratio and a lower specific fuel consumption, than any other such turboprop. (For comparative data see accompanying table.)

Effect on future airplane development must be the symbiosis of the new engine may be in reaching, or swaying additional customers to turboprop powered aircraft.

Transport Characteristics. It is understood that since the engine is liquid-cooled, it is possible to power turboprop aircraft of the Douglas C-124 and Boeing C-97 heavy transports, and more may be done in this harboring category of the Fairchild C-119 Packet.

It appears a reasonable assumption that the T-34 may be considered as an essential pre-emptive reinforcement for the Westinghouse R-4850 engine in any airplane which uses the best piston engine. This will include not only the stages of development of the Boeing B-52 and Convair B-36 bombers, Convair XC-99 very heavy transport, Martin PBM-1 patrol bomber, and the Boeing Stratocruiser, and other development of the C-97.

Flight Rating. The T-34 recently completed a preliminary 50-hr flight rating test at 3780 hp in good con-

dition stage and fine turbine, and with an annular type burner.

►One Control. A single control lever is provided for the pilot. A system of mechanical controls linked to the lever automatically coordinates the four fans, propeller speed, flight pitch and altitude, for the power selected.

During the initial flight test program the T-34 has been running a four-blade Honeywell Standard oil control system propeller. A blade similar to those used by Pan American Airways on its Boeing Stratocruiser. A special propeller blade design is being developed when the propeller is in full feathered position. Further improvement in engine performance is expected when quasi high speed propellers, now under development for the engine, are used with it.

►Reduction Gear. Propeller reduction gear is fluidly coupled to the gear of the transmission shaft while main gear and turbines are rigidly coupled to the rear of the compressor case. The two-stage reduction gear operates at a ratio of 1 to 4.

Hot air is used from the engine as a driving agent for the air intake area.

The engine will operate satisfactorily with either high altitude gasoline or special fuel at idle. It achieves the 6.6 specific fuel consumption during its 90-hr test. Such a rating, it is pointed out, compares well with the specific fuel consumption of high-powered piston engines in their highest power ranges.

The relatively small diameter of the T-34 in comparison with other twin-spool engines of similar power output (as the Allison T-40) makes the rear of the aircraft more spacious, an appreciable advantage. Simplicity of the single rear gear, as compared to double power with gear to a single gear box, is another aiding point.

►New Development. The new turboprop, designated Model PT-2, by its manufacturer, was developed under Navy Bureau of Aeronautics sponsorship but has already assumed considerable interest in the Air Force as a potential powerplant for bombers and heavy transports.

Only a few people know that the T-34 had a big brother, a double version, which the company called the PT-22. It was expected to attain around 18,000 shaft hp rating. The double version was also a Navy development but was shelved at an early stage for lack of funds.

The T-17 flying test bed on which the T-34 had a big brother, a double version, which the company called the PT-22. It was expected to attain around 18,000 shaft hp rating. The double version was also a Navy development but was shelved at an early stage for lack of funds.

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mainly to avoid heat complications with auxiliary powerplants.

Navy interest in turbine propeller powerplants for aircraft goes back to 1914. Two years later a Navy contract was awarded to Northrop to develop a ground gas turbine. Chrysler Corp., Allison division of General Motors and Pratt & Whitney later made development studies. The Allison single and double turbine units were the first tangible results of that program in flying turboprop engines, followed a year later by the P&W development.

Navy interest in turbines has been steadily increasing, particularly with the Convair X-15, long-range, high-speed flying boat, and the Douglas XAID carrier-based attack plane. Both of these planes, powered with Allison T-40 engines, have progressed so successfully that first flight actually under fire both are now being finalized.

Ignition Conference Meets at Toledo

The vital interest of the aeronautical industry in aircraft ignition problems found expression last week in speeches and negotiations at Chicago's Spark Plug's annual ignition conference at Toledo.

Representatives of the oilmen, engine and ignition switch manufacturers, petroleum companies and interested government agencies devoted three days to discussion of the many complex questions posed by today's demands for high power, high speed and high altitude.

The first day saw the presentation of proposed plans dealing with spark plug research activities, effects of water in ignition and ignition systems, ignition analyses, measurement of plug gap sizes, and the Scientific low-temperature ignition systems among others.

The remaining two days were taken up by round table discussions of a host of ignition and related problems, and a top Toledo, Chicago's Detroit and Cleveland meet.

J-47 Output Stopped by Strike

Federal mediators last week were called in to attempt settlement of a strike at General Electric Co.'s Air craft Division, divisional offices at Lynn, Mass., where the electricians demanded a 30-cent-an-hour wage. The work stoppage curtailed production of J-47 jet engines and parts at Lynn, and turbosuperchargers at Everett, Wash., the Spacelab factory producing electronics for both civil and military use.

The International Union of Electrical Workers (IUE) issued the call for



GE-100 HURRICANE, the G-100 turbosupercharger, is inspected by two of the men who made it: M. K. Wilcox and W. G. McElroy, GE Aircraft division engineers.

Supercharger for Super-Power

A new turbosupercharger produced by the General Electric Co. in the Pratt & Whitney R-4160 Wasp Major engine is claimed to give this engine performance increases generally obtained only by compounding an engine—but the GE development steps what and now has a name before the company is compounding.

The new engine, the G-100, handles up to 100 lb. of air at a minute, compensating it to a pressure of 50 lb. of air per minute. The new engine has the G-100 weight 180 lb. Specific fuel consumption is 0.16 lb./hr./lb. Air can be achieved. The new engine provides cabin pressurization as conditioning as up to 30,000 ft.

Development of a direct fuel injection system on the R-4160 passed the way of elimination of the ground super charge.

The G-100 now provides full engine manifold pressure. An air-cooled cylinder saddle temperature is 65 percent, making possible greater power.

Here's what GE says the Wasp Major and the G-100 can do:

- Increase takeoff power by 12 percent
- Lowered consumption by 45 percent

the strike after negotiations broke down on wage increases and a new pension plan.

General Electric reported that agreement had been near on wage, but that the company could not accept the pension proposal, which involved an employee non-contributory benefit. GE's Lynn, Everett, Wash., and the electricians demanded a 30-cent-an-hour wage. The work stoppage curtailed production of J-47 jet engines and parts at Lynn, and turbosuperchargers at Everett, Wash., the Spacelab factory producing electronics for both civil and military use.

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AF Development Center Pushed

Rapid expansion of the Air Force's Air Engineering Development Center being urged in Congress.

Rep. Carl Vinson, chairman of the House Armed Services Committee, and Sen. Lyndon Johnson last week urged federal bills requested by the Dept. of Defense, making recommendations for the center from \$300 million to \$175 million.

A high-altitude engine test chamber and a hypersonic and a supersonic wind-tunnel are being built.

XC-123 Seen in Lead in Evaluation

Chase assault transport, followed by Northrop C-125 and Fairchild C-82, seems to be leading Eglin study.

By Ben S. Lee

Flight AT&T, Inc.—An tactical support arms of the Army are set for a show-off at least on paper—the work, as much as the assault transport evaluation are being inhibited by immaturity of Wasp engines and Air Materiel Command's fuel decisions.

While evaluation measures are still under way at Eglin, the evidence results of the three newest candidates will probably place the Chase XC-123 in first place, Northrop C-125 in second place, and the stripped-down Fairchild C-82 in third place.

The would mean that Chase Aircraft Co., Teterboro, N. J., will be cited for quantity production of the C-123 with a least chance for an light YC-123 transport. USAF has evidenced considerable interest in the YC-123, but leaves more powerful engines in place of present two-engine R-1830-111 aircraft.

To meet immediate service needs of the Army (Aviation Week Aug. 26), USAF will order conversions to the air assault transport category at a small number of the 300 old C-82. Pocket transports already in service. Convair's program for the Paket, estimated at between \$15,000 and \$40,000 per plane, includes structural basing of the loose, hinged portion of the fuselage and landing gear plus installation of maximum manpower.

• **Performance.**—Plans competing at Eglin Air Force's Air Engineering Development Center are the Northrop C-125A, Chase YC-123C and XC-123 Fairchild modified C-82, and the Chase planes YC-18A (YC-122) and the XC-19 (XC-123).

• All the planned planes are all-cause high-wing monoplanes. Each has a button landing gear, permitting easy loading access to cargo compartment from the rear.

• All are basically redesigned to permit landing and takeoff in extremely rough terrain and to provide crash protection for the crew.

• The planes are classified as light and medium small aircraft—the light designed to carry 1000 lb. of cargo, the medium 16,000 lb.

• The transports are supposed to be capable of being based in gloom as a means of extending their range.

• **Performance.**—USAF has cited for a medium range assault transport in provide mobility operation, including long range and regeneration drops. The plane, however, has to be based on phone competition for assault transport needs.

• **Cost.**—Cost of operation from the air craft's standpoint, including low altitude maneuvering, low altitude flying, instrument flying, night flying, cargo cargo characteristics, fuel load holding, refueling, visibility, cockpit management and control.

• **High**—**Low**—**Takeoff** and landing performance over 100-ft. obstacle (Tallad for gliders accomplished by a C-82 in a switch pitch).

- Hard surface takeoff performance (Tallad for planes with a C-128C eng.)
- Range and radius performance with design cargo load under formation flight conditions with minimum fuel and with protected fuel only (C-123B eng. for gliders).

• **Endurance**—minimum achievable by using fuel fractions on assault tonnage (C-123B eng.)

• **Cost**—of transporting typical items of ground force equipment and supplies and Air Force engineering equipment.

• **Cost**—of maintaining aircraft and personnel.

• **Difficulties**—encountered in producing and maintaining supply operation.

• **Difficulties**—encountered and time required for maintenance.

• **Ground**—handling and maintenance equipment required.

• **Load**—**Drop**—Tallad test plane at Eglin Air Force's Air Engineering Development Center, the test bed is of use testing research. Field 3, where the tests for rough landing and takeoffs are staged, is a large area and need patching, and natural from proposed equipment and explosive tests. The test areas from the pilot's maturity, corrosion issues, and the company representative's feelings for his project.

In the tests to be completed damage was suffered by such competing aircraft and plane parts, including the landing gear, Air Force equipment, including the test bed, which the tests show that the evidence for proposed greater than the competition that would likely be encountered in actual operating conditions.

During the first week of operation, the Chase C-30 was damaged when a tow rope snapped and tore off the fuselage, but failed to pierce the pilot compartment. The stripped-down Fairchild C-82, making its third landing over a 50-ft. obstacle, from a height of 70 ft., using a fully deployed gear, suffered both front and rear landing gear failure (both front and rear landing gear collapsed) but had first and second of the left landing and horizontal stabilizer.

Chase XC-123 is making a round trip landing trials with a modified landing gear, pivoted around and twisted the left landing gear arm. The C-123 plane loaded with says, wheel off and suffered considerable skin damage.

The Northrop C-125A is a new attempt bent the center engine prop on one landing and broke a leading gear as a second gear.



HALF A PLANE in flight a little like a jet plane on the ground because the XC-120 goes for more freight while park it unfolds.



MANUFACTURERS of detachable pod gear assure that both the load and the



POD DETAILED how packplane rolls away on wheels stowed aside in flight.



TOW BAR is as unusual as rest of plane, extending between main wheels.

Fairchild's Versatile Packplane



COLLAPSIBLE LADDER stands 34 ft.

XC-120: Tomorrow's Cargo Plane?

Tractor-trailer arrangement cuts ground-handling time sharply; said to triple transport efficiency.

High-speed. An exciting new plane of its cargo lift is having its beginning here in the light and ground-trailor of the new Fairchild XC-120 Packplane.

This fast experimental tractor-trailertwo of the six in its inventory, let me add, are working. And at speed the aircraft is a veritable freight train on wheels, loading and unloading in record time.

The aircraft's wing and tailplane may well cut off a larger slice of the total transportation business for freight than the next generation in cargo aircraft previously devised here.

► **Wings.** It's-Watch with the crowd of high-speed fans on the highway until the airport and with the Army and Air Force and the mechanics in the field as the XC-120 shows what it can do.

On top of its looks, the Packplane looks like the future competitor of a jet behind power planes as it rolls down the runway boasting an 84-cylinder landing gear.

Dick Branson, Fairchild chief test pilot, substantiates the plane's weight as part of his showmanship, then rocks back the XC-120 on its rear wheels and starts it into the air.

But it comes for a smooth landing. And then, things happen fast. Within four minutes, the pack is detached from the upper portion of the plane, and it is transported to the ground on its own wheels behind a steady cargo train.

Meanwhile, Heron takes the packplane XC-120, which now looks like a cluster of go-karts and P-51s, out the air for a second spectacular flight demonstration. The plane breaks ground in less than 500 ft. and climbs and dives almost like a jet fighter.

► **What is Missing.** What does it all mean from a military cargo standpoint?

Mike Ray Hughey, USAF cargo expert at MATS, Fairchild, says the Fairchild C-119 Packplane plane from which the XC-120 has been developed.

"It is my opinion that the detachable cargo compartment will virtually triple the transport efficiency of aircraft, as applied to military operations. If a detachable cargo compartment aircraft of the XC-120 type had been used during Operation Market Garden, a saving of approximately 90 percent could have been effected. From a rough 'guesstimate,' it is figured that approximately 120 aircraft equipped with these packs could have been used to carry the daily requirements into Europe."

► **Attachment.** Patches—Four small metal latches on the top of the pack compartment attach into four latches on the belly of the cabin compartment.

► **High-speed.** An exciting new plane of its cargo lift is having its beginning here in the light and ground-trailor of the new Fairchild XC-120 Packplane.

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A single control in the cockpit releases the clutch of metal "ingers" at all four attachment points simultaneously so the pack may be dropped in flight if need be.

But when the pack is detached as a normal ground-handling operation, it is lowered by four small steel cables hooked to the pack's sides. Four other cables in the cabin compartment hold the gear down firmly enough so the pack may be dropped in flight.

► **What is Missing.** What does it all mean from a military cargo standpoint?

In ground tests, the front attachment has been tested up to a maximum weight of 55,000 lb—distributed 15,000 lb on the front boom and 30,000 lb on the rear boom. Although it is a full-scale test, the maximum gross load for the pack will be 25,200 lb.

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engaged, governed by a small loadwheel in the cabin. The gear may even be required to reduce the gear load in transmission (that is, when necessary to lengthen the main 30 in by means of a extra section).

The landing gear retraction is also used, developed by the Lear Corp. An emergency provision releases the clutch at the electric actuator allowing the gear to fall in its down position, with a final lockout burst to lock down an down position. Main wheel landing hydraulic hoses.

The XC-120, too, Post & Whitney R-4460 engine of 3210 hp driving Hercules Standard 15-ft diameter propellers, are made to those used on the C-119. Outer wing panels, empennage and tail booms, except for the extra 30 in sections, are identical with those of the C-119.

At present the Packplane gets a little extra room in the air, it will be the subject of a number of interesting experiments in an effort to determine the full military utilization of such a novel aircraft.

► **What is Missing.** What does it all mean from a military cargo standpoint?

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What's Ahead in Congress

► Strategic air will be strengthened, although tactical aviation has priority for the time being. The reason: The North Atlantic Pact commands its 12 members to expand an attack in case of an attack on all. That means that of Russian troops invade Europe, significant, unprepared for war, the U. S. will respond with long-range bombardment on Moscow.

► An amendment, or lack of it, is being pushed into the political arena as a campaign move by the GOP. The lead editorial in the Republican National Committee's "On the Political Front" attacks the President for expanding 1950 dual-use Air Force funds and advocating legislation authorizing a 70-group USAF—which wasn't signed until two weeks after South Korea's invasion.

► Rep. Ogallala, Tex., Secretary of Defense Louis Johnson's critics on Capitol Hill are anxious about his "new program" for a 70-group USAF. They claim it's just the old 70-group program with a new face to use for the Johnson who opposed the 70-group program and now finds it distributed to customers.

► Aircraft construction will move full-scale ahead. Congress has completed action on a resolution allowing USAF and the Navy to spend funds contained in the \$15 billion defense supplemental bill. Senate action on the House version is being slowed down by other business.

► A very WPA is in the wind. That is why Col. Edward Johnson proposed that all allocation and priorities control be put under the Secretary of Commerce. "All of these activities would be in one place and could be easily shifted to a new war production board when it comes." This proposal came in the Senate, but is eliminated from the final version of the emergency power bill sent to the White House.

► Marine aviation will get a big share out of a \$100 million supplemental for the Corps, intended to reach Congress by January. The Marine Corps now has a \$125 million program for this year, which the supplemental will more than double.

► Electronics, under apparent Army requests for procurement will be included in the \$10 billion supplemental, now in the mail at the Department of Defense, and will set up a memorandum of agreement between now and January.

► National Science Foundation is probably out for another year. The House passed down \$250,000 for continuing the foundation so that it could launch its \$17-million-a-year program to promote basic research and development and war, and the Senate isn't disposed to put up a fight over the matter.

► Fleet security. Congress is trying to give the President more power to clamp rapid security regulations on aircraft and other defense planes and installations, and provide unusual penalties for violations, even through regulation.

► Strategic engine sites. The Inspector General's Office, in cooperation with the Senate's Defense "Waterbury" subcommittee, headed by Sen. Lyndon Johnson, is investigating cases of surplus aircraft engine sites Johnson is out of the sight of the investigation.

► Guided missiles. A House Armed Services subcommittee, headed by Rep. Edward Hobert, will take on a spotcheck of guided-missile institutions and plants after

the November election. The group has held closed-door sessions with top scientists and military and intelligence officials. Rep. James Van Zandt announced: "With German assistance, Russia has the lead. Our program will have to be stepped up. We want to double down, and have much."

► Fleet costs will soon be looked into by a House Armed Services subcommittee, headed by Rep. Paul Kilday. Reports are current that fewer aircraft can be produced than planned because of cost cuts.

► Air Extension Development Center. The odds for congressional approval are now better than 50-50. It would be located at the 86th Street AFM, Rikers, N. Y., and consolidate some of the current on-the-Wright Field, the Wright-Patterson, and the Tinker, N. J., and Chanute Field Stations, now Service. New Jersey congressional leaders favor the Rikers location, but USAF imports the cost of establishing the center there would be only \$3 million, compared with \$15 million, mainly for buildings, of extensions.

► Tax write-off. Stripped up amendments for aircraft and other defense planes to spur construction appear set. The proposal approved by the Senate permitting write-offs of plant costs, for tax purposes of 25 percent a year over five years, instead of 10 percent a year over a 40-year period, will probably be adopted by the House.

► 125-airplane testing program for non-combatant aircraft is set for enactment. The Administration has pushed it out of the House Interstate and Foreign Commerce Committee, where it was delayed while committee leaders tried to work out a long-term program. Aircraft manufacturers, partly because of heavy military business, are cool to a full-scale commercial plane development program at this time.

► CAA setback. CAA's \$120-million budget for this year is up for a sizable reduction under the congressional directive to the President to less \$50 million off the \$135 billion appropriated for government agencies. CAA had a \$107-million budget in the 1950 fiscal year.

► CAB chairmanship. Independent air carriers are staging a campaign in get congressional to promote the White House to fill the vacancy with a spokesman for their cause against the scheduled carriers.

► The dodging Congress will soon end with rapid revision of the 15 percent airline tax through relief packages outside the country. A provision included in the new tax bill will require that the tax be paid on all trips beginning and ending in the U. S.—regardless of where tickets are purchased.

New Laws

Congress has completed action on measures which:

- Give CAA authority to control air movements over restricted areas during an emergency
- Authorize a \$14-million new airport in the vicinity of the District of Columbia
- Set up a clearing house in the Department of Commerce for the collection, dissemination, and exchange of scientific, technical, and engineering information
- Provide for the portrayal of the story of aviation progress in the unbroken series of the historical front of the rotunda of the Capitol. The President has already requested funds for the project



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TABLE I

Cruising Speed and Altitude Trends

Aircraft	Condition	Altitude (ft.)	Speed (mph.) Indicated	Time
DC-4	Max. cruise	16,000	194	225
Cessna 170	Max. cruise	20,000	231	317
Stinson	Max. cruise	25,000	235	325
Canadair	Constant Mach number	20,000	239	493
Convair Liner	20,000 ft.	325	2195	

Note: The speeds are given at zero weight and ICAN standard temperature.

the engine continues to engine until very close to the ceiling.

While these high altitudes are necessary for economy, they are also the reason whereby we get higher speeds. Table I illustrates this point. It will be seen that in the last few years the cruising speed of transport aircraft has risen from 194 mph. in the DC-4 to 231 mph. in the 170. Much of this is due to the increase in cruising altitude from 16,000 to 20,000 ft., for the indicated cruising speed has only gone up 32 percent, and, as we stated above, some of this (about 20 percent) is due to any cut in the characteristics of the aircraft as a power unit.

Incidentally, those who like to peer into the future may deduce from this that the predicted supersonic flight probably will not be a limit to the maximum speed of future transports. For instance, it is often suggested that the aircraft will have to go supersonic at a cruising altitude which is too near the ceiling. The rate of climb will be only 30-40 mph., which will not have much effect on the forward speed.

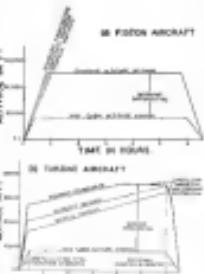


Fig. 1. Typical flight paths for piston engine craft and jet aircraft engine craft showing limitations imposed by maximum deflected temperature after ICAR standards. "Temperature maximum" is equal to ICAO "tropopause" and "tropical maximum" is 4 F. higher than CAA "hot day." Altitude are appropriate for craft with sample high-lift-intermediate ratio 4.1 and takeoff thrust loading 9.75 ft-lb.

but will apparently improve the sweep. We cannot tell exactly how far we should go, but we can make the aircraft more docile (the test method is given later), it is sufficient here to show that you should climb and not stay at the same altitude.

* The maximum rate of climb should be used in attain economic altitudes as fast as possible.

The more or less follows what has gone before. The climb will be done at maximum climbing rate and at the speed for maximum rate of climb because the forward speed is fairly high for distance covered in climb.

Now, if the aircraft will hold true, and the descent will be carried out as slow as time can be spared. There are, however, some limitations. First, the pressurizing system may not be able to maintain the descent steady because of cabin pressure at 200 to 300 ft. if the rate of descent exceeds, say, 1,000 fpm. Second, very high rates of descent are associated with forward speeds which may reach critical Mach numbers. Even if this is not the case, it may be unnecessarily uncomfortable for passengers at turbulent cloud layer, say, 30,000 ft.

The solution may well be to use slow descents and use them though in this case the angle of the descent may appear somewhat alarming. Taken all in all, we cannot yet say which is the best method of descent, and it is reasonable that at the recent IATA Technical Conference at Albany Park, N. Y., this was one of the few points on which there was diversity of view between jet manufacturers.

* The flight plan is highly sensitive to changes in ambient air temperature. While the engine accepts a range of temperature increments at takeoff, it also applies to the cruise, and this may require some explanation. With all types of engines, an increase in air temperature results in a loss in power, and normally also as an increase in specific consumption.

On turboprop aircraft, however, this loss in power occurs as additional loss of altitude and hence a further reduction in speed range. These results will be developed, along with some figures already in the Technical Wright Brothers Lecture given by A. E. Russell, chief designer of the Bristol Aeroplane Co., at Washington, on Dec. 12, 1957. From one of Russell's charts it is seen that the effect of going from Standard temperature conditions to Temperature Maximum is to decrease the speed from 545 to 527 mph., and a further increase in temperature to Temperature Minimum cuts the speed to 525 mph. The corresponding losses in range are 64 and 14 percent respectively.

[Continued on page 25]

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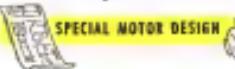
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TABLE II
Variation of Fuel Burnt
With Cruise Control Procedure
(MAXIMUM CRUISING RPM. THROUGHOUT)

Procedure	Stall Air Distance Flows for 40,000 lb (including climb)	Fuel Burnt		Cruising Speed mph	
		including climb	excluding climb		
Max. speed	2980	77	42,150	125	421 187
Constant altitude	5150	87	18,250	172	471 167
(10,000 ft.)					
Constant 10,000 ft. (100 mph.)	3292	93	17,230	189	421 182
Constant 10,000 ft.	3482	94	16,000	185	418 182
Constant 7,000 ft. (411 mph.)	3625	100	14,250	180	413 180

Even more striking is the drop in fuel economy between the constant altitude and constant speed. This factor is likely to lead to considerable difficulty in flight planning.

These five principles are sufficient for us to form a clear picture of the best present flight plan. Fig. 1 shows typical (a) piston and (b) turboprop engine flight plans for various standard atmospheres (those used here are defined in BGAU, leaflet 23). All the features discussed above are seen—the greater cruising altitude, the steep climb, the steady climbing cruise, the steady descending cruise, and, not least important, the large variation of flight plan with altitude or temperature.

► **Climbing Cruise Importance.**—Of course, the steeper initial descent and the slowly climbing cruise are likely to involve the greatest changes in air traffic control when it becomes necessary to run before and piston aircraft. In particular, the slowly climbing cruise will mean that the present method of route planning cannot be used by radio to complete a route as will be possible.

The climbing cruise and the variation of optimum altitude with temperature are the factors likely to have the greatest effect on methods of flight planning and cruise control, particularly when it is realized that temperature changes of 80° F. were experienced in a single, minutes in the recent flight of the Concorde to Central Africa.

► **Altitude, Gains.**—If we want to go into greater detail, and, in particular, in what altitude we should start the cruise, and how far we should climb, we must go to special charts for each aircraft. The most convenient chart to use for this purpose is the "Alt. Miles per Pound Graft" (Graup) first developed by BOAC and English manufacturers in 1945, which has since become a standard method.

Because the rates are kept constant during the cruise, it is possible to read the grid and now need the piston-engine chart to exclude the effect of altitude

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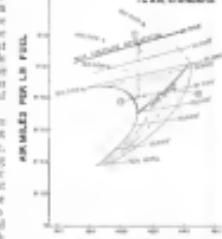


Fig. 1 Alt. miles per pound graft for typical turbojet craft, showing variation with gross weight, and piston-engine craft to exclude the effect of altitude

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passenger and nonconcession-on improved passenger service...whisks you for the millions of scheduled flying hours you have amassed...for the many air travel advancements you have pioneered and are pioneering still.

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ing, but on hosting of airline cabin. The first practical passenger trailer was a Capital innovation. Today mid-ocean pickup devices and inflation of otherwise impractical cargo-loading apparatus were first done by this interesting airline, along with many other important aviation developments.

► Capital Airlines...and its predecessor, PCCA...was the first airline to fly passengers on schedules over the mountains between Pittsburgh and Washington. Capital also pioneered the use of automatic pilots, thermal de-

► Operating Loads—The main structural components of the aircraft will usually limit the clarity with which the operating loads can be shown, as a gross requirement in developing these charts.

One of the operating loads is obviously that of the maximum altitude permissible with the limiting values of aircraft pressure. A second operating load, not immediately obvious, is the height for maximum speed at each weight. A little thought will cause one to realize that, as the pressure decreases with altitude, so does the maximum speed decrease, but the consumption also increases greatly.

On some aircraft there may also be further loads through control stick movement or by aerodynamic effects on unstepped wing design. For clarity, these are not shown on Fig. 2.

It will be noticed that on load of maximum speed is shown in Fig. 2. This last load cannot be determined with certainty until further experience is available. It is unlikely to be far to the left of the position for the maximum speed because it can be seen from Fig. 5 that the best speeds are obtained only 5000 to 5000 ft below the absolute altitude and obviously potential difficulties will prevent operation so close to the ceiling.

► Example—On this type of grid it is simple to work out the effect of different engine overrevolutions. For instance, if we take off at 150,000 ft and climb to a height of 100,000 ft and then maintain this height, we shall move from point A to Fig. 2 and then from point B to Fig. 5. The engine pressure will be 0.0300 and the engine forward speed 423 mph. If, however, we have followed the maximum speed above and let the aircraft climb in the rate so as to maintain a constant true airspeed, then we shall go from point A to point C. The true airspeed will be 415 mph. Furthermore, had the engine speed been 0.0305, so that we shall have reduced our engine overrevolutions by 15 percent at the cost of only 10 mph, or about 10 percent in speed.

It is clear that an infinite number of alternative cruise control methods can be chosen on basis from these charts. The problem is to find one that is easy to apply in practice, does not require an extra crew member if flight or reader flight planning necessitate difficult repositioning on the ground, yet comes within reasonable distance of the optimum.

► Conclusion—Two possibilities immediately come to mind. First, constant indicated airspeed and constant 100 percent of maximum thrust. Unfortunately, while the first is the simplest that can be devised, we shall use later (from Table 10) that it is not, far from the opti-

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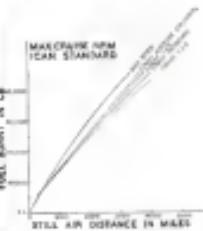


Fig. 3. Variation of fuel burnt with running procedure for some hypothetical takeoff speeds as in Fig. 2.

view from the point of view of range considerations.

Although a considerable improvement on flight at constant altitude, it must not be overlooked that, though it may well be used on short-range takeoff speeds.

The new method now proposed is essential in takeoff. Then at no more than present sensible speeds presents this to be used direct, and it will be necessary, therefore, to work from a store of chains.

First attempts to lay out such tables, however, have shown them to be easily practicable.

Fig. 3 and Table II have been calculated for the same hypothetical aircraft as above, the weight of fuel burnt for a number of running procedures. They show that even the maximum speed procedure yields only 3 percent gain over the cruising speed for the most economical procedure considered, in this case constant free slope¹⁰, though it requires as much as 25 percent more fuel. (Comparatively, a 10 percent would show a variation of 20 percent in speed for a spread of 20 percent in fuel.)

Because of the remarkable line in speed through the following relatively concentrated procedure on a horizon flight, and because of the enhanced advantage of decreasing the fuel consumed as compared with a piston aircraft, it means that the maximum speed procedure will almost never be used.

Getting Engines-At this shows the engine's lack of flexibility pointed by turbine aircraft. There is, however, one possible way of increasing fuelburning (Continued on page 32)

¹⁰A constant free slope procedure is the most economical considered in Fig. 2 and is the one to be used in the following discussion. Therefore, a constant free slope procedure corresponds to a given altitude profile. If the aircraft flies the level above the tropopause, this would correspond to constant true altitude.



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ments provide the system of the future.

The D-C system diagrammed here is typical of those operating on aircraft such as the Martin 202, the Lockheed P-38, the North American AJ1, the Northrop G-115, the Avia Sud-Est SE-2010 and the Breguet 763.

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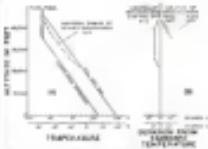


Fig. 4 (a) Typical ambient air temperature reduction required against standard atmosphere. (b) Corresponding temperature plotted in terms of deviation from various standard atmospheres, showing advantages of use of CAA "hot day," if flight altitude exceed 10,000 ft. without pressurizing the transport.

That is, shutting down one or more engines in flight, and continuing to operate at maximum rpm. on the other engine.

On a four-engine transport aircraft, cutting each engine reduces the running thrust by about 10,000 lb. Each engine, allowing for the cutting of up to two engines on a four engine aircraft, the maximum speed of climb with all the reasonably conceivable different combinations appears to be less than 15 percent, compared with approximately 10 percent for a piston aircraft capable of flying at 20,000 ft. Douglas with its of more engines may therefore be attracted to an operation faced with such a limit of delay due to weather and traffic, because they should enable the aircraft to quickly be repositioned.

• **Temperature Feedback**: In, we can control any instrument to the extent of temperature as the best error control provider. This can be demonstrated only by drawing up additional steps grids like a series of temperature check boxes.

But how we must plan for a minimum, and consider how we can best arrange our charts to include temperature as a variable.

Obviously, since we intend to climb directly through the center of the temperature zone, we will also be continuously varying altitude and we shall have trouble trying to keep track of the correct chart if each is drawn up for one particular temperature. Moreover, flight planning will be a nightmare, because even the most elaborate meteorological forecasts will only give us temperatures every 5000 ft or so, and a great deal of interpolation will be necessary.

The solution to this difficulty is to use the deviations from the standard temperature at the altitude, and not the temperature itself. This will vary much less than the temperature, as can be seen from Fig. 4(b) in which some selected ambient temperature variations at flight are plotted against altitude. The

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speed of temperature is 79 deg. F.
(4 deg. C.).

However, Fig. 4(b) will show that temperature deviations can only exceed over the range -15° to $+5^{\circ}$ (in. C.).

The aeronautics people should plot all our graphs and draw up all our tables, for a series of temperature levels: ICAN, ICAN + 2IC, ICAN - 2IC, etc.
► Temperature Variations have already taken place with investigations on the possibility of obtaining forecasts directly in this way, and there is no doubt as to this approach. If the present temperature is 79 deg. F., the range of flight altitude is 30,000 ft. and the aeronautics, however, there is one point to be observed, because both the British and the American standard atmospheres reach a tropopause at about 35,000 ft., above which the temperature does not start.

In a strict practice, the temperature varies tremendously as height, not only day by day, but also with latitude, reaching as much as 60,000 ft. in the tropics. When operating through the tropics at any rate, the aeronauts temper their self-confidence to flight altitude ranges above 35,000 ft., so that the temperature deviations from ICAN and NASA standard will allow an abrupt change at that height, as disclosed in Fig. 4(b).

For consciousness in flight planning and in actual control of the aircraft during flight it is advisable to use the temperature deviation from the "ICAN Hot Day". If the more exact control charts are to be used as temperature altitude as well, it may even be found desirable to use a new "standard stages plan" which has the same standard temperature and height, not ICAN and ICAN, but in which the range which contains the flight up to the tropopause height at which the aircraft is capable of flying.

In such a short article, it is only possible to touch briefly on the basic problems of aeronautics. It is hoped, however, that sufficient has been said to indicate that obtaining the best out of these new transports will require the use of operational techniques of a high order.

A turbine aircraft is essentially a precision instrument capable of a remarkable performance. It is a precision instrument and must therefore present precision aircraft. Operation of turbines or turboprops in flight must be to maneuver lightly, and the usual operation with heated instruments must be avoided for a long time to retain high percent equipment. But for the well-engineered and established aircraft they offer a chance of improving the standard of passenger travel-in safety, speed, comfort and cost-in an extent impossible in any other way.

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Effect of Air Bleed On Engine Operation

"Compressed air isn't free" is a concept frequently cited in technical studies.

The problem of bleeding air from the compressor outlet for miscellaneous services long has plagued designers of engine exhaust and accessories. Those concerned with deriving high engine and aircraft performance have opted, in general, for bleed air from the bleed air system, while, on the other hand, it offers a convenient power source for operating various systems.

Considerable question of compressed air may be required for operation of control and future noise control systems, for such uses as other pressurization and conditioning, protection against ice formation, and aircraft control systems.

During this situation, the National Advisory Committee for Aeronautics has conducted research to determine just how severe the effect of bleed can be.

Its findings are given in a recent Technical Note (161) "Effect of Compressor-Duct Air Bleed for Specific Modes of Engine Operation," by technician F. E. Ross and S. E. Kautz.

Analytical results agreed well with those of experimental investigations.

The agreement tends to substantiate the grossness of the methods used in the analytical determinations, which in the data were obtained by the methods of components of a different aircraft, but higher than that used in the experimental determinations of the effect of air bleed.

In general, bleeding air from the compressor outlet of an aircraft, turbine, decreases thrust by slightly more than double the percentage of bleed and increases the specific fuel consumption slightly less than double the percentage of bleed for mixed bleed, after-turbine, or bleed air, respectively.

During the turbine inlet temperature or increasing compressor inlet temperature (constant) the effect of air bleed on engine performance becomes of reduction in turbine inlet temperature.

In all modes investigated, there was no significant difference between variable and constant bleed rates. Single mode operation for all bleed up to about 0.10 of compressor air flow.

Rotary Actuator

A little rotary actuator has been added to the large family of automatic products now manufactured by Lear, Inc., 1391 Lincoln Ave., N. W., Grand Rapids.

Designated as the Model 167A, the unit weighs less than one pound. It develops a maximum peak output of 110 in-lbs. with a normal rated peak load of 60 in-lbs. Lear says the device produces a non-linear torque output which approximates typical aircraft door, damper and fuel valve load curves "resulting in high 'feel' and 'tight-closing' torque required for valve system control."

During operation with fuel, oil and pressure valves, it is an excellent tool for load control and hydraulic relief, locking controls, and dampers. The company says it can also be used to replace mechanical and solenoid-operated drivers, particularly in applications where the load varies with the stroke.

The unit requires less than one second to complete its full 90-degree shaft rotation under the normal wind and load condition of 60 in-lbs. At this load, the time required to complete the operating cycle is 10 times that valve closing occurs at high speed but shortens this time linearly to avoid resonance effects in the hydraulic system. The actuator can also be equipped with an adjustable slip clutch which compensates for hydraulic surge loads.

The integral life of split-second-rotated motor drivers the unit is rated for an intermittent duty cycle of one second on and two seconds off. Lear says the device is designed to meet latest government specifications.



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- **WIDE-BASE WHEELS** for increased load capacity.
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- **SAFE-TYPE STEERING** for easier handling.
- **UNI-GEAR ROBES**—precision built.

FINANCIAL**Depreciation Rates to Be Changed?**

Laws of present transport types may be extended, as military needs delay development of new planes.

The effect of changing would be to extend laws of present transport types and laws may dictate legislative changes in related financial policy can come right equipment.

Gloucester has always been for more important that the actual savings out of planes in dictating depreciation rates for aircraft in commercial service. Obsolescence may now be postponed almost indefinitely, as far as it may permit to existing as transport types in a result of the current world-wide industry position.

The present situation is in contrast to all aircraft now flying modern, positive aircraft. In addition, it will pose some new long-range problems for the industry. Much immediately, it may increase airline earnings, at least temporarily.

The replacement of flight equipment in the air transport industry has been based on the theory of obsolescence. The use of more powerful aircraft benefits the operator, through increased economy and lower operating costs. Consequently, depreciation rates are based on the assumption of more rapid obsolescence of equipment than modern types of aircraft.

Capital Demand—Large-scale fleet replacements, in the past, have created heavy demands on new capital requirements to finance the purchase of new airplanes. This factor, if continued unabated at frequent intervals, is bound to undermine the investment stability of the industry.

The nation's urge to gain the world's ascendancy in the military field of air or railway transport for commercial service is not yet off the boil. The continual expansion of the development would, of course, have a direct impact on the finance and operation of all air carriers. Once again, the rate would be reduced to reflect the need and the future with the most advanced available transport type.

Nevertheless, competent aeronautical authorities have questioned whether a jet passenger-transport type could be developed in time to meet the requirements of 1957. The problem is that no new order was issued to start production. Further, the engineering "logjam" was eliminated and safety and dependability clearly established. High fuel consumption and associated traffic

costs forced, to place the new aircraft version in service. Factors after war than the present and full of uncertainty will affect the future. The Gloucester will ultimately correct its current shortcomings, but it will take more time and expense.

Any relatively new aircraft type, such as envisioned in the jet and fatigued design, will be required to submit to an even more rigorous and exacting proving period by the CAA before being certified.

Value Up—The stability of these aircraft will also have to be established. Factors of these factors, which determine the value of flying transports now in operation. For example, most owners assigned a sensible life of four years to DC-4s. In more instances, this equipment has been written down to residual value averaging around \$25,000 per plane. Yet, the rising demand for DC-4s to day is resulting in firm bids of a maximum of \$375,000 to as much as \$512,000 per plane for the DC-4s.

Present depreciation schedules on part were framed on the basis of the CAA definition of DC-4 series as essentially unchanged on a seven year cycle. On the basis, the initial group of these planes is due to run out of depreciation within the next few years.

In all cases, it should become a reasonably evident lag before present depreciation schedules run their full course that revision of charges may be in order. High depreciation charges represent a heavy cost of aviation.

By extending the depreciation basis, which would be based on increasing total life, the CAA would extend the 55 aircraft, the 12 months ended March 31, 1950, reported a net operating income of \$25,162,525. However, the percentage on flight equipment for planes imported to \$56,345,314.

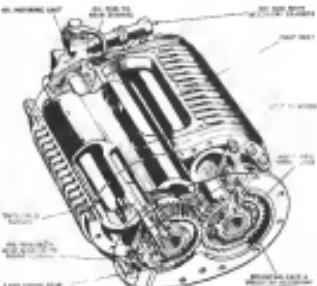
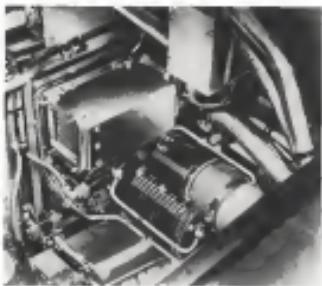
More for Taxes—The figures are also being confronted with a normal tax rate of 45 percent with the expectation that the high unpaid will remain for some time to come. The early extension of depreciation rates will naturally mean higher taxes.

A heavy drainage of airline revenues will make it difficult to secure the sufficient funds to help finance replacement equipment purchases to replace existing fleets.

The higher and more likely to get will for new aircraft types components, subsequent airline financial problems, such as World War II, material costs were being absorbed in the rate of DC-4s to the government. The cost of construction per aircraft was \$100,000. When the time came to replace equipment funds after the war, starting with DC-4s, it was discovered that capital requirements per airplane were twice those that showed from the disposal DC-4s.

A repetition of the same pattern may again be in the making.—Bobby Aitchison

EQUIPMENT



Godfrey cabin superchargers shown mounted on a North Star Merlin engine (left). Courtesy of Roots-type blower shown in sketch (right).

British U. S., Cabin Blowers Evaluated

TCA installs Godfrey superchargers in its fleet of North Stars; Status units go into RCAF's C-5.

Installation of a British-designed cabin supercharger on Trans-Canada Air Lines' fleet of North Star transports, and use of a U. S. Roots-type supercharger in some Canadian aircraft, is going into design as a chance to evaluate competitive units under nearly equal conditions.

TCA has outlined its transports with Godfrey Type 15 ML 9 units, made by Sed Godfrey & Partners (Canada) Ltd. At about the same time, Canadian Airlines installed Model 560-6 blowers made by Status Corp., Farmington, as a C-5, identical to the North Star type except that it mounts the DC-6 type nacelle and Pratt & Whitney R-2800 engines instead of the Rolls Royce Merlin in the North Star. The C-5 is the passenger plane of Canadian Prime Minister Lester B. Pearson.

Installed for cabin pressurization and air conditioning, Godfrey claims that the equipment is much simpler and more convenient to operate than the previous installation. It indicated that TCA's desire to select a cabin supercharger other than the one delivered with the North Star was predicated so that that the hydraulic drive of the original units would not interfere during takeoff.

Decided to install the Godfrey blower mounted from a unit by TCA on

assembly status and incorporate an emergency disconnect of the blower from the engine in case of failure.

In the case of the C-5 installation, used in the hydraulic coupling and to isolate the supercharger is driven from the engine at supply, eliminating the usual supercharger air tank and cooler. The air flow is 180 lb per minute.

►Godfrey Design.—The Godfrey supercharger is a positive displacement clean of the Roots type. Basically different from the centrifugal supercharger, it consists of two interlocked, intermeshing rotors revolving within a aluminum housing.

As in the case of the Status unit, it mounts directly on the acceptance section of the engine. Since the speed ratio available from the Merlin engine is not sufficient, a gear up gearbox was required, bringing the supercharger speed up to 779 rpm clockwise.

The gear sets available to the Status unit are 1.50:1 and 1.67:1.

Two Godfrey blowers are provided on each plane, a standard unit.

The Godfrey installation also includes a filter in the air intake to protect the equipment from foreign material and an acoustic silencer in the outlet duct to reduce supercharger noise.

COMPARATIVE PERFORMANCE

►At delivery, Godfrey supercharger, 10 lb of air at 2400 engine rpm and ambient altitude of 20,000 ft.

Status supercharger, 51 lb of air at



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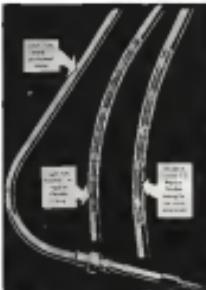
Push-Pull Controls

Improved heavy-duty push-pull controls, produced and guaranteed for aircraft, are being offered by Standard Avionics Inc., Farmingdale, N.Y. They were developed especially to meet stringent requirements based on the latest military specifications affecting that type of equipment, according to the firm.

The new controls are descendants of those produced by the company during the war. Standard engineers have added these improvements:

- Stronger sliding rods, made of aluminum instead of chrome molybdenum.
- Reinforced cable guides to prevent damage from vibration and impact.
- Improved push-pull ratio, giving 100 per cent high load ratio, guides are double-clad (machined) instead of single-clad (machined). This makes them less apt to "cock" the dog-legs in case tubing will break or create excessive friction or "jams" when control system is exercised in compression.
- Better sealing of controls at each end to keep moisture and dirt out of tubing—but great care.

Standard says its latest push-pull



control will be used for operation of a door on the Martin 4-0-4. It also reports they are being used in military craft.

Units have operated satisfactorily in tests over thousands of cycles at temperatures ranging from -73 to 160°F.

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and are designed to operate for about 1 million cycles without requiring lubrication. For heavy-duty work, controls are available in integral or flexible designs in No. 5 (from .005 in. o.d.) and No. 7 (.06 in. o.d.) sizes. Light-duty units also are available.

ALSO ON THE MARKET

Small relay with AN connector is automatically sealed and has been given full engineering approval by the Air Materiel Command. Standardized package will accommodate 3 snap-in units in center combination up to and including four-pole double throw. Address: Advance Electric and Relay Co., 2451 N. Norma St., Bakersfield, Calif.

Electric support harness not only decreases 6000-lb. panels. Standardized harness that weighs only 1800 lb. at cost of static. Controls can be added to adjust base of base as desired. Tool will make, crimp, work, bend, crimp, cut, over or punch. It has 14 in. maximum stroke, working height of 44 in. below spindle, 95 x 144 in. base and weighs 50 lb. Address: Black & Decker Inc., 30 Pleasant St., New Haven, Conn.

Vessel coating for thermoplastic tanks and similar parts withstands cold and most chemicals at higher temperatures for longer periods than rubber insulation. Maker says high dielectric strength of product, Goss Plastic 610, permits thinner walls than are possible with other insulating materials. Coatings also claim plastic film over certain low temperature characteristics and that it is the only compound of its type available for protection into any given depth from 1/16 in. to 1/2 in. Address: Goss Co., 514 Rose Ridge, Cleveland 13.

Speedy machinist's vice can be quickly spread as close to any position through pedestal action—eliminating need to lay handle or adjustment wrench down across work. Clamps and wrenches are easily removable. It has negligible end clearance and can hold work in exact position. It has negligible end clearance and strength of conventional model, maker says. A little over one ton of handle counter clockwise to loosen you, prevent it to be shouldered to head by any position. When work is engaged vice operates in conventional manner. Address: Dodge Mfg. Corp., Melrose Park, Ill.

Safety holder for hanger and apron work is made of aluminum alloy in maximum strength with light weight. Wide step support 600 lb. each, while holder will weigh only 150 lb. It can be used as a 6-ft. stabilizer or extended to as tall as 10 ft. height. Legs carry rubber casting to protect surfaces in contact with the work. Address: Original Products Co., P.O. Box 755, Ft. Worth



OKAY—so you've got to load something!

We've told you lots of ways to avoid emergency landings, but let's assume you're coming down anyway



Here are a couple of pointers that may wear a happy ending to a very tight landing.

1. If you've got your choice of 40, pick a big book of chess squares, even though the button may be rougher than that little parking lot across the road. A smooth surface doesn't help much when drivers out enough of it to slow down.

2. Be sure to land on the road and above all, to maintain your flying speed.

3. If you're breaking over the shoulder and it's apparent that you can't stop, sit

the nose of your ship between a couple of trees so that the wings (not the tailplane) will absorb most of the shock.

Now let's assume you've got your one section of wire from \$10.00 per

AND HERE'S ANOTHER TIP:

Now that you're up and around again, and contemplating a bit of flying...

Don't get caught with your tail pasture down!



There's nothing, positively nothing that will keep that old engine happy like a canister full of Gulfline Aviation Oil—Spoon D.

Ask any pilot! It's the front line detergent depression of oil there is no better quality oil produced—no other oil has enough Gulf's exclusive Activator process to remove these messes earlier and longer!

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A FRIEND HEAD-ON...



Gulf Oil Corporation . . . Gulf Refining Company

AIR TRANSPORT

Airline Unions Press Wage Drives

ALPA backs mileage limitation plan; pilots to share benefits produced by flying new, faster aircraft.

By Charles Adams

Airline unions are putting new power in their hands for higher pay and other concessions from the carriers.

Indications are multiplying that the negotiating groups will not come away from the bargaining tables empty-handed.

Pilots Feared Weakness—An approach that the government may force wages during the present inflationary emergency has hit a fair number of unions.

At a result, some of the negotiations that have dragged on for many months are in a critical stage. Higher living costs and severe pay increases in other industries (mostly the voluntary basis maintained by insurance companies) have contributed toward the increased union pressure against airline management.

Neither can an airline pilot pay up the 14-month-old dispute between the Air Line Pilots Assn. and American Airlines. Mediation was broken by last month ALPA's written objection, but the company has not agreed to it.

DAM Campaign—Meanwhile, Ann of Machinists is making a strong push for higher wages and pay raises TWA, National, Pan American, Northwest and United. Last Fall, most of the companies can be sure when the union received an ultimatum were provided a lengthy 10-cent-an-hour wage hike from United, attractive to Jim.

Although the annual fall for short of IAM's demands, it did end under management's held-the-wage line stand.

Earlier this year, ground employees affiliated with the Transport Workers Union ratified new contracts with two major carriers, each with pay increases in excess of the nation's 10 percent. That the wage round had been started. New rounds of pay boosts, conditioned with soaring medical costs, not only threatens other pilots but may mean higher fares as well, according to some industry officials.

The UAL-IAM round can set an industry pattern. National Airlines, for instance, reportedly has concluded, to pay the same pay boost granted by United.

Northwest and TWA have agreed to

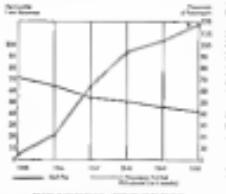
abstain with IAM. A strike vote has been taken among IAM members employed by Eastern, but a new strategy at least IAM and Capital Airlines who are attempting to work out a new contract.

ALPA Demands—The big issue in American Airlines' marathon negotiations with ALPA continues to be the pilots' demand for a monthly mileage limitation to combat technological wage inflation and cockpit devaluation resulting from the unfair use of longer, faster and more productive transports (AVIATION WEEK May 15). To the carriers, the ALPA bid for one pay for less work contributes "dilution

of pay." ALPA's proposal that a monthly "fair pay" round could ease a theoretical maximum of \$320 monthly if it flew the 1500-mile max. max. full day and half night. That's about \$12.20 an hour. The new formula would raise the pilot's pay to about \$14.12 an hour—equal to 15-percent wage hike.

ALPA asserts that it is not "further negotiations" when employers ask to share the "inflationary cost of living" resulting from technological advancement. "Mileage pay limitation," according to ALPA President David L. Belsky, "has a critical national defense aspect since it will mean more trained pilots available for national defense."

Belsky points out that the National



PIONEER'S PROGRESS
The nation's first negotiated formula, Pioneer Air Lines, showed as rising passenger oil cost and decreased dependence on air pay when it celebrated its 60th anniversary last month. FLA has raised over \$100,000 per month since August, 1965, an option by rates from 24.65 cents miles, rising to 26.65 cents miles, averaging 24 cents per mile. FLA's 26.65 cents per mile is 10 cents less than the metal three Latin flight clubs. A consultant says miles under 1965 Pioneer has twice paid dividends to stockholders.

Labor Board supported the possible but not need for mileage limitation when it set up the pilots' wage increase in 1956. Railroad engineers now have a limit of 4000 miles per month.

Ability To Pay—ALPA asserts that American's bid predominantly other carriers can afford the mileage limits.

ALPA says that when applied to Convair the proposal would for \$17.75 more pay for flying 75 hr, than is now given for the full 36 hr, monthly maximum. A DC-10 option would get \$21.10 more for flying 75 hr, than is now being received for the 35 hr, maximum.

(ALPA officials expressed belief that pilot demands for other benefits, such as monthly time limits, might, in practice, restrict a pilot's maximum monthly flight time to considerably less than 75 hr.)

At present, on ALPA's base pilot pay with eight "fair pay" round could ease a theoretical maximum of \$320 monthly if it flew the 1500-mile max. max. full day and half night. That's about \$12.20 an hour. The new formula would raise the pilot's pay to about \$14.12 an hour—equal to 15-percent wage hike.

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Union Opposition—ALPA contends its demands are far from unreasonable. It says that under the new formula a Convair pilot would get only about 33 percent more pay than was specified for a DC-8 pilot in the original NLRB mileage limitation wage scale set up in 1954. For DC-8 pilots the pay would be 35 percent over the rate originally established for DC-8s.

The union points out that from the standpoint of plane miles flown, the Convair is 32 percent more productive than the slower DC-8, and it is 45 percent more productive. Convair goes more productively has of course increased even more.

ALPA argues that AA is 1945 out the way, with 36 cents an hour, with a raises from 40 to 45 to 50 cents an hour. That is probably closer to what the pilots are requesting. In addition, ALPA claims, the unorganized employees were later given increased pay increases.

"In 1953, the legal minimum wage was 36 cents an hour, with a raise of 45 hr per week per week," the union continues. "Today the legal minimum is 75 cents an hour, with a minimum of 40 hr. That is an increase of 240 percent in wages and a decrease of more

than 16.6 percent in working hours. Based on these figures, pilots would receive about \$3950 for 75 hr of flying on DC-10s."

Formula Explained—Here's how the proposed mileage limitation formula works for American's present pay structure:

The base pay at 15,000 miles planes monthly on DC-10 is \$41.60. Pay for flying would be \$10.00 for 100 hr and the DC-10's flying speed. With the Convair's 1500-mile speed, 15,150 miles miles are produced in 85 hr. Difference of 38.15 miles planes for the Convair and 11,600 for the DC-10 gives a \$5.93 plane-mile productivity increase.

ALPA would divide this productivity increase by two, leaving 1765 miles to be used for the plane's benefit. The DC-10 base of 15,000 miles would be added, making a total Convair mileage limit of 16,562 miles per month. Paying about \$16,562 by 225 mph (the Convair's flying speed) maximum monthly flight time would be 75 hr.

DC-8 Limit—The DC-8, with a flying speed of 281 mph, now miles planes monthly under the 8500-mile limit. Subtracting the DC-8's base mileage of 13,000 leaves a 3690-mile increase in productivity for the DC-8.

Dividing the 3690 by two gives a 1845-mile increase to be used for the plane's benefit. Add the DC-8 base of 13,000 miles planes, and the DC-8 mileage limit per month under the new formula would be 17,827 miles. At 218 mph, this is equal to 75 hr of flying monthly.

The new formula works for any plane. Take half the difference between the DC-8's flying base and any airplane's speed multiplied by 225 mph will add it to the DC-10 base of 15,000 miles monthly.

Final Pay-Off—Under contract negotiations would keep ALPA pilots from taking a pay cut despite the reduction in hours. Mileage pay would be increased by boosting the existing speed of the new stage under the contract formula.

Thus the net effect of paying under the Convair's 150 mph speed while the new recognized speed would be 215 mph.

There would also be an added element called "gross weight pay." This would be one-half per mile for each 6000 lbs. gross weight of the ship in relation to the aircraft's maximum landing weight.

Thus, at present, a Convair cockpit's \$1000 basic pay and an 80 hr monthly would include \$1000 base pay, \$500 hourly pay and \$156 per mile. The \$156 per mile would be under the new pay scale for a 75 hr month would be \$675, which based pay \$480, hourly pay \$473, aircraft pay \$152 and gross weight pay \$111.

Despite this the sum necessary in order to maintain a reliable three-engine

Findings Issued In AA Dallas Crash

Early execution of an engine-out approach probably caused the crash of an American Airlines DC-10, though an attempted landing at Love Field, Dallas, Tex., last Nov. 29, according to Convair's final report on the accident.

The board's final report on the accident suggested that the crew did not take the coldest positions which became necessary when they decided to land with the No. 1 engine inoperative but contributing importantly in the crash was an engine failure management which resulted in an insufficient amount of fuel remaining in the No. 4 tank.

From On-Board from New York to Mexico City, the DC-10 experienced an altitude loss of the No. 3 engine while flying at 30,000 ft. When the engine failed, the board's report says, the crew failed to level off despite successive attempts it was fuelled. The crew decided to return on to Dallas, believing the engine could be returned to service if landed with it running.

After No. 1 engine was feathered, no attempt was made to transfer fuel from No. 1 into tanks, resulting in about 1400 lb more weight being on the left side of the plane than on the right when it arrived at Dallas.

Whether Love Field was close with only 4000 ft of clear, but the turn to final approach caused the DC-10 to the left of the runway, and an "S" turn was made to correct the misalignment. During the turn the plane shifted to the left, the left wing dropped sharply and the ship went around.

Ship Stabilized—At this point the captain increased power to Nos. 2, 3 and 4 engines in an attempt to maintain control. The ship continued turns the left of the landing runway at a full turn altitude. An engine control rod (the No. 3) broke, causing a stall and a roll-off into the ground.

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Wings Preceded—CAB said that it would be final around the captain did not consult with the sponsored procedures for an engine-out approach with DC-10s in mind. The board's report said that the captain, "in accordance with the procedure the pilot shall not use more than 10 degrees bank when he is positive he can complete the landing."

Despite this the sum necessary in order to maintain a reliable three-engine

rate of climb. In this case, the plane extended fully during execution of the "S" turn.

Turning to the faulty fuel management, CAB said it was impossible to compute exactly how much gas remained in No. 4 tank each time the DC-10 made its approach at Dallas, but on final approach the flight engineer said he was using a running light fixture and the fuel was under No. 4 engine tank.

Fuel Pressure—Fuel pressure gauge was out and full throttle applied to engine No. 4 engine came on with a "no fuel" gauge at power (overrunning), the left wing dropped and the plane started to turn to the left. Just before the crash the No. 4 parallel was further when it was noted that fuel pressure in No. 4 engine was zero.

The flight engineer said his gauge indicated fuel was about 60 gal of fuel left in the No. 4 tank. The captain said, "I came in and was unable to level off despite successive attempts it was fuelled. The crew decided to return on to Dallas, believing the engine could be returned to service if landed with it running.

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The Martin transports, to be delivered next month, are to add 1000 lb to 54,000 which TWA contracted for in March. Earlier last month, TWA placed a 1000-lb order for six more L-747s. Convair's 100-seat and Pan Am's 100-seat transatlantic aircraft will be 56,000 lb (AVIATION WEEK April 22).

747s On Order—TWA's purchase of 40 passenger 44-44s, which total sales of Martin's new transatlantic twin-engine aircraft to 55. Both TWA and EAL had options to purchase more of the planes when the original order was announced six months ago. Price per

EDITORIAL

Nonskeds Must Clean House

Whether the nonskeds realize it or not, new danger signals are flying. It's the public—not the CAB—that must be watched.

Most of you readers know that we have always been a friend of the unscheduled air carriers. From their beginnings, we have countered that their lower fares tapped a new market in passenger transportation, and that the major scheduled lines could learn some of their traffic economics and lack of fares. We urged the CAB to permit at least some of them to operate, if they operated safely.

Although there have been several accidents on the transcontinental runs of the nonskeds, the number has been much less than the established industry expected. The cost-to-cost nonskeds have a much better safety record than these flying charlatans.

For months the nonskeds operated magnificent cat and barn barn flying public. Recently, however, the tide has turned. Some of the carriers and agencies acted gravely in their public relations and services. Whether the percentage of agencies and carriers that guilty or not is not as important as in the fact that enough have been guilty to shake public confidence. In this case, the public is beginning to warn more about being matched than about being scammed. This is reasonable.

Advocating has been misleading, if not inaccurate. The public is being guaranteed service; it is not always getting. And "deceit" we are surprised at often is the carriers and the agencies would have the public believe. There is no correspondence in so frequency of service, destinations, and types of equipment. High rates are charged in advance for "four-engined aircraft" flights that turn out to be flown with twin engines or more. Fares range all over the scale. People are kept waiting hours, sometimes days.

North American Airlines Insurance Coverage

AT NO EXTRA CHARGE

Passenger liability claim liability coverage is provided by liability policy with the underwriting of the AIR MARTINS OF AMERICA providing passenger liability insurance up to \$100,000 per person.

You may now purchase any flight insurance up to the amount of this coverage, however, if you so desire, without any extra charge.

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Probably the most misleading practice merely because it confuses the passenger about the type of basic coverage in effect. One or two carriers, at least have been handing out passenger slips such as the one reproduced above. The implication is that the

passenger is covered by trip insurance. Actually, in this case, it is the carrier who is insured by the insurance company. To collect, a passenger or his heirs might well be compelled to sue the carrier, or insurance act. In some states where liens are in effect, it would be impossible for an unpaid passenger or his heirs to collect anything approaching \$100,000. There might also be a judgment that the carrier was not guilty of negligence, which would further complicate the problem.

We certainly don't think off the nonskeds are guilty of sharp business practices. But if any of them continue to mislead the public in such manner they run the greatest danger of losing the very public confidence and support that has made it so difficult for CAB to close put them out of business.

While the nonskeds lose the public support, they will find that the next series nonskeds may well drag them all down to oblivion. These are bad words, one attractive word, but deadly words of warning.

The Railroads' Toll

The next time you hear about the railroads' safety record you might keep in mind that the heralded figures are the number of train passengers KILLED while riding on trains.

You do not hear that in the years 1938 to 1948, in those years there were 58,301 Americans killed by the nation's railroads. In the same period 983,125 were injured.

These figures include passengers, tourists, travelers not on trains, employees on duty. These categories include guide coming accidents.

But they are all Americans killed and injured, those kinds of them, as a result of trains.

Now, you tell us. Suppose written verbal telling 5100 persons each year (roughly the 1949 total for the rail roads) and injure 31,000—whether they were passengers or victims in houses under falling planes or as line employees of airports.

Would we American people take the matter as calmly as we do the railroads' yearly toll? Why do we fail to consider that this rail toll is awful? Why aren't the newspaper headlines shouting these figures from the front page? Fifty deaths in an airline is top news. Thirty thousand deaths a year from trains is a figure buried in the Interstate Commerce Commission's final report.

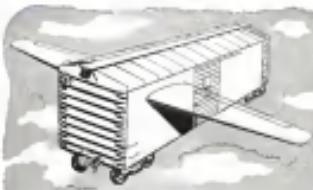
Without attempting to say why to dismiss the rail roads of credit for their fine passenger fatality rate, let's remember there is much more in the railroads' overall safety record than meets the casual eye.

—Robert H. Wood

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The Fairchild C-119 twin-engine cargo and troop transport is engineered to fill the order for a plane that can utilize small landing fields. By long or short distances economically—carry huge loads of men, cargo and equipment under all operating conditions.



THE FAIRCHILD C-119 in which maximum space is utilized was instrumental in the basis of the current C-119 design. The rear or center split-gate design is best reliable cargo storage space.



LOAD BOARDING at truck load height is easily accomplished by the rear center split-gate doors—the bays opening outwards to allow direct loading of freight and equipment.



VERSATILE the C-119 can be equipped either as a troop transport, litter carrier or heavy cargo aircraft. Passengers and equipment are easily dropped from the rear doors.



LONG- OR SHORT-DISTANCE HAULS covering a variety of military cargo shipping lines "C" routes to distant fields make the Pecked All-Around's most efficient transport plane.

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NON-STOP LONDON TO NEW YORK. WITH AN INCREASED PAYLOAD!

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Yes, this flight against normal headwinds can now be made by today's transport aircraft equipped with the new G-E CH9 turbosupercharger. It is possible because the CH9 injects extra miles and extra power into today's piston engines—extras which spell longer ranges and heavier payloads.

The CH9 was developed by General Electric as a component part for the Pratt & Whitney Aircraft R-4360-C engine. This new powerplant has been subjected to grueling tests under difficult conditions.

In addition to increased power for cruising, this development makes possible more takeoff power and lower fuel consumption.

Shorter takeoffs, more speed and much heavier payloads are the resulting advantages of this new powerplant.

Vastly simpler than any other compound engine now on the market, the new powerplant eliminates troublesome geared superchargers, clutches, gearings and fluid disks that waste energy and add expense. There are no mechanical connections between the engine and the turbo.

In the present configuration, the CH9 is fitted to the R-4360-C. It can be adapted to any piston engine of similar size. For further information, call your nearest G-E sales representative or write Apparatus Dept., General Electric Co., Schenectady 5, New York.

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